4. Office Operations:

4.1 Red Flag Verification

1. Formal verification of Red Flag Warnings in Southeast Idaho began with the 2000 Fire season and is now a permanent part of the fire weather program. Verification is based on current Red Flag Warning and Fire Weather Watch criteria that has been coordinated with local land management agencies and published in the Great Basin Fire Weather Operating Plan. Current criteria for the Pocatello Fire Weather District are shown in paragraph 4.1.2 below.

2. Fire Weather Watch/Red Flag Warnings: Fire Weather Watches and Red Flag Warnings, are issued for conditions of high to extreme fire danger (as determined by USFS/BLM) and dry fuels, in combination with one of the following:

a. General "dry" thunderstorm activity - "dry" means that thunderstorms will produce little or no measurable precipitation (precipitation < 0.10 inch) but significant lightning.

b. The occurrence of lightning after an extremely dry period.

c. The passage of a cold front which will result in sustained winds of 20 mph or more. Also, a period of sustained winds 20 mph or more.

d. In the judgement of the forecaster, weather conditions and fire danger will combine to create a critical fire control situation, such as the combination of long term drought, very low humidity (<10% day and <35% night), and high Haines indices of 5 or 6.

Red Flag criteria are developed from a local knowledge of fuel types, terrain, weather conditions common or unusual to the area, historical fire behavior, and judgement of the local land management agencies. Because the criteria for issuing Red Flag products can vary from one district to another, these verification results are not necessarily comparable with all other forecast offices.

3. Methodology:

Verification of Red Flag Warnings were conducted on a zone by zone bases. Example: If a warning for strong wind was issued for fire weather zones 409 and 410, but strong winds were observed only in zone 410, then this counts as 2 warnings, 1 that verified and 1 false alarm. Also, if strong winds were observed in zone 412, but no warning was issued, then this would be counted as 1 missed event.

Sources of verification included both manual and automated observing systems such as Remote Automated Weather Stations (RAWS), Meteorological Reporting Stations (METAR), local MESONET reporting networks, lighting data, upper air RAWINDSONDE (weather balloon) data, WSR-88D Doppler Weather Radar observed winds and estimated precipitation, volunteer weather spotter information such as heavy rain events, and reports of observed fire behavior from personnel in the field.

Statistical parameters were calculated as follows:

Probability of Detection POD = a/(a+c)
Critical Success Index CSI = a/(a+b+c)
False Alarm Rate FAR = 1-(a/(a+b))

where

a = the number of correct warnings (verified)
b = the number of incorrect warnings (not verified)
c = the number of events not warned

4. Sources of Error:

In fire weather zone 411 there are only to observing stations (Island Park and Moody). Sustained winds over 20 mph are rarely observed at these stations. However, phone conversations were field personnel and local spotters often indicated significant winds did occur, particularly in the Henry's Lake area.

Personal judgement was required to determine when "dry lightning" was more than an isolated event, and when thunderstorms with wetting rain were significant in areal coverage.

Field observations of fire behavior was an important indicator of Red Flag conditions. On days or in locations where there were no on going fires this was not available.

The RAWS stations report a 10 minute average wind while the METAR stations report 2 minute average winds. This is further complicated by some local mesonet stations that report a 5 minute average wind.

Skill and lead time vary with the type of event.

5. Decision Criteria:

Wind - In order to eliminate events like isolated canyon winds, verification of wind events generally

required two observing sites within each zone to report sustained winds of 20 mph or more. An exception was made for fire weather zone 411 where there are only two reporting stations. The Island Park RAWS site has enough canopy or wind blocking terrain that strong winds are not likely to be reported. Therefore only one site observation was required for this zone.

Lightning - Archived lightning data was used to determine verification. A good deal of judgement was needed to determine if the observed lightning was more than an isolated event.

Wet versus dry thunderstorms - WSR-88D Doppler Weather Radar precipitation estimates and surface observations were used in the verification process. Once again, a fair amount of judgement was required to determine which events qualified as "dry lightning" events. The number of reported fire starts is not a reliable indicator since lightning strikes can occur outside the thunderstorm precipitation shield.

Other - Reports of observed fire behavior from personnel in the field were useful when dealing with long-term drought conditions and days of repeated low relative humidity. This was particularly troublesome since there were days when sustained fire runs were observed, but winds were less than 20 mph, lightning was isolated or did not occur, and humidity varied from 5 to 15 percent. The Haines index was usually 5 or 6 on significant days, but could be on other days as well..

6. Results:

The year 2001 was characterized by persistent drought conditions for the second year in a row. Red Flag Warnings were issued on 14 days this fire season in the Pocatello Fire Weather District.

	May-June	July	August	Septembe r-October	Total
Total # of watches	8	8	2	7	25
Total # of warnings	10	13	10	9	42
Verified warnings that were preceded by a watch	7	8	1	5	21
Warnings verified (a)	9	9	7	6	31
Warnings not verified (b)	1	4	3	3	11
Events not warned (c)	5	0	7	8	20

Table 4.1. Red Flag products issued in the WFO Pocatello Fire Weather District

Red Flag verification resulted in the following:

Probability of detection POD =	.61
Critical success index CSI =	.50
False alarm rate FAR =	.26
Average lead time for all events =	3 hours 04 minutes

7. Implications:

Despite continued severe drought conditions over Southeast Idaho, fire activity was substantially lower than last year. A total of 42 (111 in 2000) Red Flag Warnings were issued this season. Red Flag Warnings were in effect on a total of 14 days (32 in 2000). Of the 42 warnings issued, only one was issued for "dry" lightning (fewer starts), the rest were issued for winds and low relative humidity. Several of the wind events were marginal in meeting the sustained 20 mph criteria. This at least partly contributed to a lower CSI of .50 (.69 in 2000).

4.2 Spot Forecasts prepared by WFO Pocatello:

Wildfires	117
Prescribed Fires	78
Other	0
Total	195

(Verbal Telephone Briefings = 19)

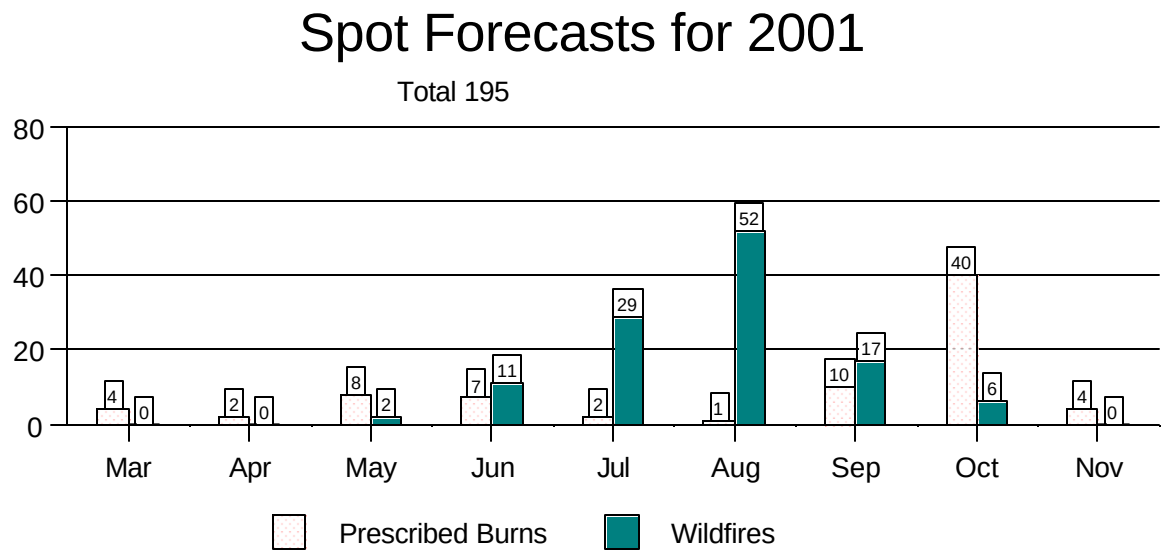

Figure 4.1. Spot Forecasts prepared by the Pocatello Fire District during the 2001 fire season.

4.3 Fire Dispatches supported by WFO Pocatello: There were a total of 4 IMET dispatches resulting in 29 man days served out of the office.

Table 4.2. Incident Meteorologist Dispatches.

Date	Dispatch Location	Incident Meteorologist
July 6 to July 11, 2001	Fisherman Complex, Bridger-Teton NF, Pinedale,Wyoming	Bob Survick
July 27 to July 31, 2001	Snowshoe Fire, Frank Church River of No Return Wilderness (area managed by Salmon-Challis NF), Landmark, Idaho	Bob Survick
August 25 to September 6, 2001	Fridley Fire, Gallatin NF, Livingston, Montana	Jack Messick (training)
September 29 to October 3, 2001	West Hell Canyon Fire, Black Hills NF, Hot Springs, South Dakota	Bob Survick

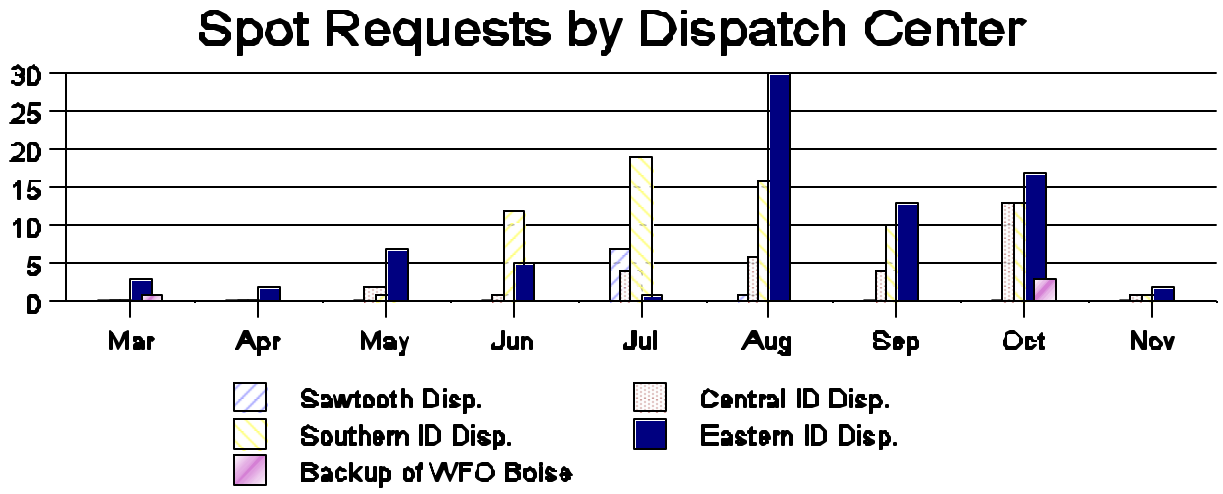

Figure 4.2. Spot Forecasts requested by dispatch area during the 2001 fire season in Southeast Idaho.

4.4 Training: WFO Pocatello staff participated in the following training courses during the 2001 season.

Forecaster	Training situation
Sharon Alden	Instructor S-290 Intermediate Wildland Fire Behavior, March 20 and 21, 2001, hosted by BIA at the Fort Hall Fire Staiton
Bob Survick	Instructor S-290 Intermediate Wildland Fire Behavior, May 15, 2001, hosted by the Snake River Hot Shots, Idaho BLM, held at the Pocatello Regional Airport.
Bob Survick	Instructor S-290 Intermediate Wildland Fire Behavior, June 11 and 12, 2001, hosted by Southern Idaho Interagency Dispatch, at the College of Southern Idaho, Twin Falls, Idaho.